Prof. Williamson's contributions to biological science were commenced forty years ago, and embrace investigations into the structure of the Foraminifera, the Rotifera, the scales and bones of fishes, and the fossil plants of the Carboniferous and Oolitic periods. These comprise works of great merit and value, not only on account of their accuracy and the extent and novelty of the observations which they contain, but by reason of the breadth of view and the philosophical spirit which pervade them.

His labours in Vegetable Palæontology are above all remarkable, being alike laborious, searching, and productive of important results. These are embodied in six contributions (of which the last will soon appear) to the Philosophical Transactions upon the organisation of the fossil plants of the coal-measures—and one on the restoration of a Cycadeous tree (*Zamia gigas*) from the Yorkshire Oolite, published in the Transactions of the Linnean Society. These are not only models of laborious research and exact description, but they are illustrated by more than fifty plates, devoted to microscopic analyses of vegetable tissues, obtained by making transparent slices of the fossils. Both the slices and the drawings are made by Prof. Williamson himself, who thus, to his reputation as a biologist, unites those of an accomplished artist and a skilful lapidary, qualifications which should be named along with those for which the medal is awarded, because no unscientific lapidary could have obtained equally illustrative sections, and no common artist could have depicted them with equal exactitude. The more important results thus obtained refer to the structure, affinities, and reproductive organs of Calamites and its allies, to Lepidodendron, Sigillaria, Lepidostrobus, Asterophyllites, and to other genera of the Carboniferous epoch.

In addition to these contributions to the history of previously known genera of that epoch, Prof. Williamson has been able to show, on the one hand, that groups of now living plants which were not previously supposed to have a great geological antiquity, actually flourished during the Carboniferous period, and, on the other, that plants of that period which had been previously referred with confidence to groups now living, have in reality other and widely different affinities.

The medal was received by Prof. Williamson.

SCIENTIFIC SERIALS

Astronomische Nachrichten, No. 2014.—In this number appear some interesting observations made by Nicolaus V. Konkoly on the spectrum of meteorites. Some 130 of the August meteors were examined, and it was observed that the nucleus gave a continuous spectrum, the apparent colour of the naked eye predominating in the spectrum. The tail of the yellow meteors gave the sodium lines only, the green one gave magnesium lines, and the red ones strontium or lithium. The sodium lines were present in all. In some of the larger meteors the author suspects the spectrum of iron is present.—Position observations of Coggia's comet are given by Argelander and by Tebbutt, of the Windsor Observatory, N.S. Wales.—Dr. Kleim writes objecting to the explanation of variation of brightness of Jupiter's moons during transit, given by Herr S. Alexander.—Dr. Luther gives position observations of Peitho (118) and elements of Danäe (61).—The elements of Borrelly's comet are given by Grützmacher, and those of Sylvia by Tietjen.—F. Anderson sends an opposition ephemeris of the planet Undina for November and December.—Prof. Spoerer gives observations of sun-spots and protuberances; and observations of the occultation of Venus by the moon, taken at Kiel, are given.

Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie.—Dec. 1.—In an article on the non-periodic movements of the barometer and the baric windrose, Dr. Köppen, taking into consideration the almost constant cyclonic movement of the air in Europe, asks how it is, while gradients are steepest with west and south-west winds, that when the barometer is observed at equal distances round a minimum centre, it is not found to be highest where the south-west wind is blowing. The mean height of the barometer is on the contrary considerably higher with north and east winds. The explanation lies in the difference between northern and southern Europe with respect to the magnitude of non-periodic oscillations of the barometer.—The low pressure in the north and north-west during the prevalence of south-west winds is not compensated by an adequately high pressure in the south and south-east. Air flows thence either to form a maximum over a small space in high latitudes, or southwards over a large space without causing high pressures. Similarly, but conversely, with north and east winds.—Among the "Kleinere Mittheilungen" we have a notice of Prof. Dove's article on cool Mays after mild Januarys, published in the magazine of the Berlin Academy. Herr Dove regards as proved a tendency to low temperatures in spring after warm winters. It appears that a mild January is generally followed in the interior of continents by a mild May, on the north and east coasts by a cool May, on the Atlantic Ocean again by a May milder than usual.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, Dec. 10.—"On the Development of the Teeth of the Newt, the Frog, and certain Lizards, and on the Structure and Development of the Teeth of Ophidia." By Charles J. Tomes, M.A.

The descriptions given by Arnold and Goodsir of the development of the human teeth have been already demonstrated to be in material respects inaccurate as applied to man and other Mammalia; and the present paper shows that the accounts propounded by Prof. Owen, of the process in Batrachia and Reptilia, which are practically an extension of the theories of Goodsir to these classes, are even more at variance with the facts of the case.

There is in no Batrachian or Reptile any open groove or fissure ("primitive dental groove"); there are, at no period of development, free papillæ; consequently the whole process of "encapsulation" has not any existence, but is purely hypothetical. From first to last the whole process of tooth-development takes place in solid tissue, beneath an even and unbroken surface; with which, however, the young tooth sacs have a connection through a band of epithelial cells. The first process is a dipping down of a narrow process of the oral epithelium, the extremity of which, after it has penetrated in some, as the snake, to a great depth, becomes dilated, and is transformed into the enamel organ; and this is the case whether a recognisable coat of enamel is or is not to be found on the perfect tooth. Subsequently to the dipping in of the band of epithelium, and concomitantly with the dilatation of its end, a dentine pulp is formed opposite to it. This may constitute the entire tooth sac, which is then wholly cellular, as in the newt; or it may go on further to the formation of a connective-tissue tooth capsule. The external thin structureless coating of the teeth of Ophidia is derived from an unmistakeable enamel organ, developed as above described; it is therefore enamel, and not cementum, as it is denominated by Prof. Owen. The successional tooth sacs, very numerous in the snakes, are located in a sort of capsule: this character, peculiar to the Ophidia, and most marked in the lower jaw, is of obvious service during the extreme dilatation which the mouth undergoes, as is also the tortuosity of the process of epithelium, before it reaches the collection of tooth sacs. The epithelial band may be traced winding by the side of the older tooth sacs till it reaches the position of the youngest, where it ends in a cæcal extremity, to be transformed into the enamel organ next developed. In fine, the stages of open groove, free papillæ, and encapsulation of the same have no existence whatever in Batrachia and Reptilia, their existence having been previously disproved in Mammalia.

"Experiments showing the Paramagnetic condition of Arterial Blood, as compared with the Diamagnetic condition of Venous Blood." By Richard C. Shettle, M.D.

The experiments consist in suspending between the poles of a powerful electro-magnet arterial blood, hermetically sealed in a glass tube, in a medium of venous blood, and venous blood in the same tube, previously well emptied of its contents, in a medium of arterial blood, care being taken to avoid as far as possible any exposure of the blood to the atmosphere; thus preventing any alteration in its physical characteristics as regards the gases which it contains.

In the former of the two cases the testing tube was found to take an axial, and in the latter an equatorial position.

Dec. 17.—"Note on the Vertical Distribution of Temperature in the Ocean." By J. Y. Buchanan, chemist on board H.M.S. *Challenger*. Communicated by Prof. A. W. Williamson, For. Sec. R.S.

From newspapers and other reports which have been received by late mails, it appears that the distribution of temperature in the ocean is occupying the attention of a certain portion of the scientific public, and even giving rise to considerable discussion. The observations made on board this ship, and more especially in the Atlantic, have furnished the greater part of the material on which the various speculations have been founded. It appears to me that one point suggested by these observations has not received sufficient attention from those who have written and spoken on the subject—I mean the effect of the changing seasons on sea-water. Consider the state of the water at and near the surface of the ocean, somewhere not in the tropics. To be more precise, let us suppose that we have taken up our position in the middle of the North Atlantic, somewhere about the 30th parallel. This part of the ocean is not vexed with currents, and affords the best possible field for the observation of the phenomenon in question. The whole ocean, enclosed by the 20th and 40th parallels of north latitude, and the meridians of 30° and 60° west longitude, forms one oceanic lake, not affected by the perturbing influence of currents or of land; and where, therefore, the true effect of differences of atmospheric temperature on the waters of the ocean may be most advantageously studied. Let us assume the winter temperature of the surface-water to be 60° F. and the summer temperature to be 70° F. If we start from midwinter, we find that, as summer approaches, the surface water must get gradually warmer, and that the temperature of the layers below the surface must decrease at a very rapid rate, until the stratum of winter temperature, or 60° F., is reached; in the language of the isothermal charts, the isothermal line for degrees between 70° F. (if we suppose that we have arrived at midsummer) and 60° F. open out or increase their distance from each other as the depth increases. Let us now consider the conditions after the summer heat has begun to waver. During the whole period of heating, the water, from its increasing temperature, has been always becoming lighter, so that heat communication by convection with the water below has been entirely suspended during the whole period. The heating of the surface water has, however, had another effect, besides increasing its volume; it has, by evaporation, rendered it denser than it was before, at the same temperature. Keeping in view this double effect of the summer heat upon the surface water, let us consider the effect of the winter cold upon it. The superficial water having assumed the atmospheric temperature of, say, 60° F., will sink through the warmer water below it, until it reaches the stratum of water having the same temperature as itself. Arrived here, however, although it has the same temperature as the surrounding water, the two are no longer in equilibrium, for the water which has come from the surface has a greater density than that below at the same temperature. It will therefore not be arrested at the stratum of the same temperature, as would have been the case with fresh water, but it will continue to sink, carrying of course its higher temperature with it, and distributing it among the lower layers of colder water. At the end of the winter, therefore, and just before the summer heating recommences, we shall have at the surface a more or less thick stratum of water, having a nearly uniform temperature of 60° F., and below this the temperature decreasing at a considerable, but less rapid rate, than at the termination of the summer heating. If we distinguish between *surface water*, the temperature of which rises with the atmospheric temperature, following thus, in direction at least, the variation of the seasons, and *sub-surface* water, or the stratum immediately below it, we have for the latter the (at first sight) paradoxical effect of summer cooling and winter heating. The effect of this agency is to diffuse the same heat to a greater depth in the ocean, the greater the yearly range of atmospheric temperature at the surface. This effect is well shown in the chart of isothermals, on a vertical section between Madeira and a position in lat. 3° 8′ N., long. 14° 49′ W. The isothermal line for 45° F. rises from a depth of 740 fathoms at Madeira, to 240 fathoms at the above-mentioned position.* In equatorial regions there is hardly any variation in the surface-temperature of the sea; consequently, we find cold water very close to the surface all along the line. On referring to the temperature section between the position lat. 3° 8′ N., long. 14° 49′ W., and St. Paul's rocks, it will be seen that, with a surface-temperature of from 75° F. to 79° F., water at 55° F. is reached at distances of less than 100 fathoms from the surface. Midway between the Azores and Bermuda, with a surface-temperature of 70° F., it is only at a depth of 400 fathoms that we reach water of 55° F.

The above theory of vertical diffusion of temperature in the ocean, owing to convection brought about by the yearly range of temperature at the surface, presupposes that (at least in regions where the range is considerable, and where the great vertical diffusion of heat in question is oberved) the slightly concentrated water, descending from the surface as the winter approaches, does not meet water of greater density at the same temperature than its own. Unfortunately the determination of the specific gravity of water below the surface is much less simple than that of the temperature. For although we have an instrument which gives, within any required degree of accuracy, the density of the water at any depth in exactly the same way as the thermometer gives its temperature, the results of the observations are composed of three factors, which depend on the temperature, the pressure, and the *salinity*. By sending down a thermometer along with it we might clear the result for temperature; by noting the depth we might clear for pressure; but the result so cleared would not represent the salinity of the water at the depth in question, but the average excess of salinity of the column of water above it, over or under the mean salinity assumed for sea-water, in the calculation of the pressure exercised by a column of it. There remains, therefore, nothing for it but to fetch a sample of water from each depth, and determine its specific gravity on board. As this is an operation which takes up some time, the number of "serial specific gravity" determinations is comparatively small.

The following are the results of two which were obtained on the voyage between Bermuda and the Azores. The results show the specific gravity at 60° F., that of water at 39°·2 F. being taken as unity.

I. was taken on June 18, 1873, in lat. 35° 7′ N., long 52° 32′ W.

II. was taken on June 24, 1873, in lat. 38° 3′ N., long. 39° 19′ W.

For comparison I give one equatorial and one South Atlantic "serial specific gravity" determination.

III. was taken on Aug. 21, 1873, in lat. 3° 8′ N., long. 14° 49′ W.

IV. was taken on Oct. 3, 1873, in lat. 26° 15′ S., long. 32° 56′ W.

Depth in fathoms.	Specific gravity at 60° F. Distilled water at 39·2° = 1.			
	I.	II.	III.	IV.
0	1·02712	1·02684	1·02591	1·02703
50	...	...	1·02658	1·02682
100	...	...	1·02643	1·02649
150	1·02701	1·02677	...	...
200	...	...	1·02620	1·02608
250	1·02683	1·02641	...	...
300	...	...	1·02610	1·02573
400	...	...	1·02629	1·02554
500	1·02604	1·02608	...	...

From the figures in the Table it will be seen that in that part of the ocean the specific gravity of the water in summer decreases from the surface downwards. As a rule it attains an inferior limit at a depth of from 400 to 500 fathoms, which it preserves to the bottom. In those latitudes, therefore, the stratum of intermixture extends down to 500 fathoms; and this may be said also to be the depth to which the sun's influence at the surface penetrates. The results in column III. show the curious phenomenon of the surface water being specifically lighter than any water below it, and that under an equatorial sun. The position of this sounding was peculiar, inasmuch as it was within line of separation between the Guinea and the equatorial currents. All along the equatorial section the water at 50 and 100 fathoms was found to be specifically heavier than either at the surface or that at greater depths. All along the equator, however, a current runs with great velocity; and I have invariably observed that strong surface-currents introduce considerable irregularities into the specific gravity of the water near the surface. The effect of the greater specific gravity at 100 fathoms conspires, of course, within the small yearly range of temperature, in preventing vertical diffusion in the above described manner. Column IV. shows a return, in the southern hemisphere, to a state of things similar to that which obtains in the North Atlantic.

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* There will, I think, be no violence in assuming an acquaintance with these charts, at least among the scientific public, as they have lately formed the subject of lectures by Dr. Carpenter, and will no doubt have been published before this reaches England.

We have seen that the effect of climate in equatorial regions is to render the sub-surface water much colder than it is in temperate regions; let us consider what would be the effect of a polar climate on the sea-water. It must be observed that the effect of the atmospheric temperature on the sea is determined by the temperature assumed by the surface-water; now the lowest temperature which surface-water can attain is its freezing-point. As the temperature of the air when the *Challenger* was beyond the 60th parallel was almost constantly below 32° F., freezing must go on to a very great extent in winter, and the effect of freezing such water is, in the end, similar to that of evaporating it; it is separated into lighter ice, and denser mother-liquor, which sinks, leaving ice on the surface. This ice I found to be a mixture; and on determining the melting-point of some in crystals, which had formed in a bucketful of sea-water, I found it began to melt at 29·5° F., the water produced by it being almost fresh, in comparison with sea-water. The lowest temperature of surface-water registered was 27° F.; this happened on two occasions, but was quite exceptional, the usual surface-temperature varying from 32° to 34° F. At this temperature a sensible quantity of ice would melt, giving very light surface water. On two occasions the specific gravity of the surface water was found between 1·02400 and 1·02410. The specific gravity increased rapidly up to a depth of 100 fathoms, when it remained pretty uniform to the bottom. Here, as at the equator, it is in winter that the sub-surface water perceives the effect of the change of season, the mother-liquor of the forming ice diffusing in its descent the temperature of its formation.

In the discussion of oceanic phenomena too much attention is usually paid to the great currents. When it is wished to study the phenomena due to temperature, or to any single cause, the effect of the winds, which is seen in its most intense form in the ocean currents, should be eliminated as far as possible; which in this case can only be done by selecting comparatively motionless seas, like the one which I have mentioned in the North Atlantic.* When the effect of atmospheric climate has been studied on the ocean at large, it would then be proper to apply the experience gained to the consideration of the more complicated phenomena of the currents.

I am at present engaged in a detailed consideration of the temperature and specific gravity results, principally in the direction above indicated, and hope shortly to be able to send it home for publication.

"On Polishing the Specula of Reflecting Telescopes," by W. Lassell, F.R.S., V.P.R.A.S.

The object of this paper is to describe a method of giving a high lustre and true parabolic curve with ease and certainty, by appropriate machinery, to the surfaces of the specula of large reflecting telescopes.

Linnean Society, Dec. 17.—Dr. Allman, president, in the chair.—Dr. Allman read a paper on "The diagnosis of new genera and species of hydroids," which we will give next week.—Mr. Daniel Hanbury exhibited specimens of an African *Kleinia* which had flowered at Mentone.—Mr. Pryor exhibited branches of the famous "Glastonbury Thorn," noted for always flowering in December.—Sir J. Lubbock, Bart., F.R.S., read "Observations on Bees, Wasps, and Ants." In this paper the author continued the observations read before the Linnean Society last year. In order to test the power of communication which they possessed, he placed various bees on honey, but found that if the honey was out of sight and in a place not frequented by bees, few, if any, others came. For instance, he brought a bee to a honeycomb, weighing 12½ lbs., placed on his writing table; she returned over and over again, but no other bee came. Other experiments of the same kind convinced him that some bees at any rate do not communicate with their sisters, even if they find an untenanted comb full of honey, which to them would be a perfect Eldorado. This is the more remarkable because these bees began to work in the morning before the rest, and continued to do so even in weather which drove all the rest into the shelter of the hive. That a few strange bees should have found the honey is natural enough, because there were a good many bees about in the room. With reference to the affection which bees are said to feel for one another, he observes, that though he had repeatedly seen them lick a bee which had smeared herself in honey, he never observed them show the slightest attention to any of their comrades who had been drowned in water. Far, indeed, from having been able to discover any evidence of affection among them, they appear to be thoroughly callous and utterly indifferent to one another. As already mentioned, it was necessary for him occasionally to kill a bee, but he never found that the others took the slightest notice. Thus, on the 11th of October he crushed a bee close to one which was feeding, in fact so close that their wings touched; yet the survivor took no notice whatever of the death of her sister, but went on feeding with every appearance of composure and enjoyment, just as if nothing had happened. When the pressure was removed, she remained by the side of the corpse without the slightest appearance of apprehension, sorrow, or recognition. It was, of course, impossible for her to understand his reason for killing her companion, yet neither did she feel the slightest emotion at her sister's death, nor did she show any alarm that the same fate should befal her also. In a second case exactly the same occurred. Again, if while a bee is feeding, a second bee is held by the leg close to her, the prisoner, of course, struggles to escape and buzzes as loudly as she can, yet the selfish (?) eater takes no notice whatever. So far, therefore, from being at all affectionate, he doubts whether bees are in the least fond of one another. Their devotion to their queen is generally quoted as a most characteristic trait; yet it is of the most limited character. For instance, on one occasion he changed his black queen for a Ligurian, and placed the old queen with some workers in a box containing some comb. Sir John was obliged to leave home on the following day, but when he returned on the 20th he found that all the bees had deserted the poor queen, who seemed weak, helpless, and miserable. On the 31st the bees were coming to some honey at one of his windows, and he placed this poor queen close to them. In alighting, several of them even touched her, yet not one of them took the slightest notice of her. The same queen, when afterwards placed in the hive, immediately attracted a number of bees. Although the experiments on colour which Sir John has already recorded are tolerably conclusive, still he thought it would be worth while to make some more. For instance, he brought a bee to some honey which he placed on blue paper, and about three feet off he placed a similar quantity of honey on orange paper. After the bee had returned twice he transposed the papers, but she returned to the honey on the blue paper. After she had made three more visits, always to the blue paper, he transposed them again, and she again followed the colour, though the honey was left in the same place. The following day he was not able to watch her, but on the 14th she returned to the honey on the blue paper. He then again transposed the papers. At 8·5 she returned to the old place and was just going to alight, but observing the change of colour, without a moment's hesitation dashed off to the blue. No one, he says, who saw her at that moment could have entertained the slightest doubt about her perceiving the difference between the two colours. He then proceeded to recount some experiments on the sense of smell possessed by bees, on their power of recognising their own companions, and on the different occupations of different bees, mentioning observations which seem to show that the bees act as nurses during the first few weeks of their life, and only subsequently take to collecting honey and pollen. He then proceeded to mention some experiments on wasps, which show that they possess the power of distinguishing colour. In conclusion he recorded a number of experiments on ants, which certainly seemed to show that, whatever may be the case with bees, ants do possess the power of communicating detailed facts to one another. It is remarkable, however, how much individual ants appear to differ from one another in character.

Chemical Society, Dec. 17.—Prof. Gladstone, F.R.S., vice-president, in the chair.—A paper On Groves' method of preparing chlorides, by Dr. Schorlemmer, F.R.S., was read. He finds that the process does not answer well for the higher primary alcohols, although secondary chlorides can readily be prepared by it. The other papers were: On the precipitation of metals by zinc, by Mr. G. L. Davies; Researches on the paraffins existing in Pennsylvanian petroleum, by M. T. M.

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* It will be seen that the principle, that the depth to which the effect of the sun's rays penetrates depends on the yearly range of temperature of the water at the surface, explains the presence of the large body of comparatively warm water in the North Atlantic, the existence of which has been usually ascribed to an assumed reflux or back water of the Gulf Stream. The warm water is due to no extraneous cause, but is the natural effect of the conditions of climate at the surface; and the effect of these conditions of climate are so apparent in the temperature of the water, just because it is free from the influence of oceanic currents, and exposed to the effects of climate alone.

Morgan; Some remarks on the preceding paper by Dr. Schlorlemmer; and a Note on Aricine by Mr. D. Howard, who finds that this is really a distinct alkaloid existing in certain kinds of reputed cinchona barks.—The Chairman announced that Prof. C. Maxwell had promised to give a lecture on the 18th of February, On the dynamical evidence of the molecular constitution of bodies.

Meteorological Society, Dec. 16.—Dr. R. J. Muir, president, in the chair.—The following papers were read:—Atmospheric pressure and rainfall, by John C. Bloxam, F.M.S.—Remarks on West India Cyclones, by H. F. Jahncke. This paper is a continuation of a former one read before the Society in February last.—Notes on the weather experienced over the British Isles and the north-west of France during the first few days of October 1874, by R. H. Scott, F.R.S. The object of this paper was to show that the charts in the *Bulletin International* are drawn upon insufficient data. It also recommended the adoption of the conical projection on charts for meteorological purposes.—On a new self-registering hygrometer, by H. Negretti, F.M.S., and J. W. Zambra, F.M.S.—Results of meteorological observations made at and near St. Paul's Island, in the South Indian Ocean, by R. H. Scott, F.R.S.—Description of a new patent portable magnetic anemometer and current meter for maritime use, by R. M. Lowne.

Entomological Society, Dec. 7.—Sir Sidney Smith Saunders, C.M.G., president, in the chair.—Mr. E. A. Fitch exhibited some oak-galls formed by insects of the genera Dryocosmus and Aphilothrix, of which descriptions had been published in a recent number of the *Entomologist's Monthly Magazine*, together with three curious bud-galls, unknown, from Rayleigh, in Essex.—Mr. Champion exhibited a box of Hemiptera, collected by Mr. J. J. Walker in different places near the Mediterranean.—Prof. Westwood forwarded a letter he had received from Mr. Stone, accompanying a sample of tea imported from Shanghae, infested by a small beetle which proved to be the *Ptinus hololeucus*. Also a letter from Prof. Forel, of Lausanne, stating that the *Phylloxera vastatrix* had made its appearance among some vines at Pregny, in the canton of Geneva, which had been introduced from England into the graperies of the Baron Rothschild, and that the Phylloxera had been discovered in two of his greenhouses among vines planted in 1869, sufficiently distant from each other to render it improbable that the insect had been communicated one from the other; and he therefore concluded that the disease had been introduced in 1869 from the graperies in England. He was anxious to ascertain whether the vines in the English graperies were less influenced than those out of doors; but none of the members present were aware of the occurrence of the insect in England out of doors, as it had hitherto appeared in greenhouses only.—Mr. C. O. Waterhouse communicated some "Synonymical Notes on Longicorn Coleoptera."

PARIS

Academy of Sciences, Dec. 14.—M. Frémy in the chair.—The proceedings commenced by M. De Lacaze-Duthiers presenting to the Academy the first two volumes of his "Archives of Experimental Zoology."—The following papers were then read:—On the originating centres of the plague of 1858 and 1874; epidemic nature and contagion of this plague; by M. J. D. Tholozan.—Note on the distribution of water in Egypt and in Greece, by M. Belgrand.—M. Le Verrier presented a new theory of the planet Neptune.—Determination of the velocity of light and of the sun's parallax, by M. A. Cornu. As the mean of 504 experiments, the author has obtained the value 300,000 kilometres per second for the velocity of light *in vacuo*. The determination of the solar parallax is determined in three ways: (1) Observation of the eclipses of Jupiter's satellites—mean result 8″85. (2) Analytical methods founded on the comparison of astronomical observations with theoretical laws based on the principle of gravitation—mean result 8″86. (3) Geometrical methods founded on the parallactic displacement of certain planets. Result obtained from opposition of Mars in 1862 was 8″84.—Observations on the phenomena essential to fertilisation in the fresh-water Algæ of the genus *Batrachospermum*, by M. Sirodot.—Theory of cyclonic meteorological phenomena, by M. Couste.—Observations on the reproduction of the Phylloxera of the vine, by M. Balbiani.—The American species of the genus Phylloxera, by Mr. C. V. Riley. The author recognises sixteen well-defined species.—Method followed in searching for the most efficacious substance to oppose to Phylloxera at the viticultural station of Cognac, by M. Max Cornu.—Experiments made with poisonous agents on healthy vines, by M. Baudrimont.—Telegrams from M. Janssen, director of the Japanese Transit of Venus Expedition, to the Minister of Public Instruction, to the Academy of Sciences, and to the "Bureau des Longitudes," were read. Letters referring to the transit were received also from M. E. Mouchez, director of the station at St. Paul, and from M. Fleuriais, director of the Pekin station.—Observations on Borrelly's last comet, by M. Stéphan.—On the stability of equilibrium of a heavy body resting on a curved support, by M. C. Jordan.—On cubic residues, a note on the theory of numbers, by M. P. Pepin.—On two simple laws of the active resistance of solids, by M. J. Boussinesq. This is a continuation of the former paper bearing this title.—Observations relating to a recent communication by M. Volpicelli on electric induction, by M. E. Blavier.—On the inconvenience of employing vessels of Bohemian glass in chemical analysis, and particularly in alkalimetry, by M. P. Truchot. The author states that French soda glass is not sensibly attacked by boiling water.—On the action of hydrogen on silver nitrate, by M. N. Békétoff. It had been stated by M. Roussel that silver nitrate was reduced by hydrogen, while, on the other hand, M. Pellet maintained that pure hydrogen had no action on solutions of this salt, and that reduction was effected in such cases by the presence of traces of arsenic in the hydrogen employed, or by the presence of an excess of silver oxide in the nitrate. The author of the present communication made, therefore, a series of experiments with carefully purified hydrogen, from which he concludes that this gas does reduce the nitrate either in neutral or feebly acid solutions. The recent researches by Dr. Russell in this country on the same subject do not seem to have come under the author's notice.—Action on the economy of the derivatives of the biliary acids, on the colouring matters of the bile, and on cholesterine, by MM. V. Feltz and E. Ritter.—Anæsthesia produced by the intra-venous injection of chloral in a case of hollowing of the tibia and ovariotomy; acidity of the chloral solution; method of neutralising it, by M. Oré.

BOOKS AND PAMPHLETS RECEIVED

BRITISH.—Gums, Resins, Oleo-Resins, and Resinous Products in the India Museum or produced in India: Dr. M. C. Cooke (London, India Museum).—Economic Geology; or, Geology in its relation to Arts and Manufactures: David Page, LL.D., F.C.S., &c. (Wm. Blackwood).—The Last Journals of David Livingstone. 2 vols.: Horace Waller, F.R.G.S. (John Murray).—Origin of Creation; or, the Science of Matter and Force: Thos. R. Fraser and Andrew Dewar (Longmans),—The Botanical Locality Record Club: Report of the Recorder for 1873 (E. Newman).—Anthropological Notes and Queries: British Association (Stanford).—The Conflict between Religion and Science: J. W. Draper, M.D. (H. S. King and Co.)—The Doctrine of Descent and Darwinism. International Series: Oscar Schmitz H. S. King and Co.)

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